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to improve the quality of the vital statistics of the United States. The Census Office at the present time does not make any independent effort to collect statistics of births and deaths. Its statistics are based upon the returns of local and State offices in the so-called registration area, and obviously its work is affected by the quality of local registration. One of the greatest defects is lack of uniformity of procedure in the several States, and it is the endeavor of the Census Office to remedy this defect. These pamphlets represent a campaign of education along this line, and give hopeful promise of great improvement in the future.

The last in this series, No. 107, is by far the most important. It includes an account of the methods of reporting causes of death and duration of illness in the United States. A copy is given of the standard certificate of death which is followed at the present time in eight States and in twenty-one cities outside of the given States. Copies are also given of "modified standard certificates of death." The practice of foreign countries is also detailed. Interesting comments are added on the terminology of terms employed on certificates of death to denote cause of death. Illustrations are also given showing the confusion which arises from the inexact use of "causes." This pamphlet closes with a check list of registration of officials and a record of the health bulletins issued by the several State and municipal offices.

THE LIMITATIONS OF STATISTICS.

William H. Allen, in his "Efficient Democracy," has written an Epistle to the Gentiles preaching a new gospel of the statistical method as a guide to life. He tells us that goodness is nothing without efficiency, and that efficiency finds its firm foundation in the statistical method. Just plain goodness is not enough: one must be "good for something," and this "something" is purely objective and may be counted, weighed, and tested; and efficiency develops goodness, as the time-clock and the cash register develop habits of punctuality and honesty.

And Dr. Allen, in the true evangelistic spirit, will not allow this way of holiness to remain the esoteric possession of a statistical priesthood. He goes forth to preach the statistical gospel to "every man." He tells us, indeed, that, like M. Jourdain in another field of human knowledge, we all have been more or less unconscious statisticians all our lives. We are told that, when we are conducting the ordinary operations of reasoning, we are statisticians; that the scientist reaches his result by "statistics"; that business method is practically the statistical method; and that the carpenter and plumber are quite as "statistical" as the political

scientist. It is not difficult to see the extravagance of these propositions; but we may perhaps forgive them, for they give the necessary heat and impetus that propel the apostle in his very useful social task of trying a big experiment for us.

Dr. Allen's book is not merely the exposition of an abstract theory, but a record of beginnings at least of the application of that theory in practice, along the lines of a great and vital need in modern communities. And, as such, the book is exceedingly valuable and stimulating. Whether we do or do not accept Dr. Allen's theory of the universal applicability of the statistical method, it is becoming increasingly plain that our affairs, in modern communities, are growing beyond our grasp or our means of dealing with them directly and personally. The statistical method is a means of dealing with such larger affairs; that is, its essence consists, in the case of numbers of instances too large to be grasped by the unassisted observation, in translating our individual qualitative judgments into quantitative terms, to reduce them again to the new qualitative judgment we are after. This method at best is a mechanical means, and gives us a nearer or farther approximation to the truth. It has its own limit and function, which any elementary text-book on statistics will indicate; but in the more complicated affairs of life we are compelled to have recourse to it. And, as the application of this method; is more or less sporadic at present, every new attempt that adds to our knowledge of its limitations and to the development of its capabilities is of the greatest social value.

Dr. Allen has had the great good fortune to be intimately concerned with one enterprise after another, undertaken with the object of shedding more light on dark places, and has had the great satisfaction of seeing one institutional skeleton after another rattle its dry bones with terror and the thrill of coming life. And, as at the time of writing the book most of the enterprises were in that cheerful early stage in which promise is greater than performance, the author's enthusiasm is not as yet dampened by the disappointments that will surely come, as experience reveals the limitations of his method.

The record of accomplishment so far, however, is a highly creditable one. More light has been turned on the hospitals, the organized systems of relief, and the complicated affairs of the municipality in its various aspects, as the schools, the parks, the care of the public health, and the administration of the public finances.

In the case of the New York City hospitals, for instance, a falling off of revenues and increase of debt having directed attention to their business management, it was found that the greatest disorder, obscurity, and actual lack of information characterized their records and reports, so that neither their managers nor the public knew either the cost or the

services rendered in return for cost of these enterprises. As a result of these discoveries, a schedule of uniform accounting and reporting was drawn up by a committee, adopted by the four leading hospitals of New York City in 1906, and endorsed in 1907 by a permanent hospital conference.

In the public schools, where great masses of heterogeneous human material are thrown upon the educational threshing-floor, and where the old rules fail, derived from small schools and a homogeneous, home-trained population, a record-card has been introduced, giving information as to the physical condition of each child. On the basis of this card one-sixth of the 600,000 school children of New York were examined, with results pointing clearly to definite needs in the school system. A private Committee on the Physical Welfare of School Children has been organized to carry the investigation farther into the home conditions, with a view to the improvement of these as well. Another help to the schools was the improved school census undertaken by New York City in 1906, of which Dr. Allen gives the schedule in his book.

Perhaps the most generally interesting of the various enterprises undertaken are those involving the application of the statistical method to public affairs. The duty of the citizen is one of those general duties that seems of indirect concern to the individual, yet is of the most direct concern. And yet, even when he is aroused to it, how helpless he feels in trying to cope with these mixed-up affairs so far out of reach! How many attempts at "reform" have failed because, as Dr. Allen well puts it, the leaders of public opinion have not realized that "publicity and reform have their technique as well as business and law"!

The transactions of the New York municipality, as of other municipalities, are recorded and reported in such a way that the average citizen cannot have any clear idea of what is going on,—whether his "good" appointees are really doing good work, whether his "bad" appointees are really as worthless as the campaign orator depicts them. The present comptroller of the city of New York has said that "the existing method of keeping the city's accounts serves only to conceal the facts." In his own office it had been the practice of the department to make up records for private title companies, while the city records on the same subject were years behind, so that, when the city required the information in question, it had to go to the title companies for it. Some one else said, in regard to the work of the city, "It is impossible to get information unless the seeker himself turns book-keeper."

To quote Dr. Allen on the situation: "An educational budget of \$25,000,000 is voted without school or fiscal authorities knowing what expenses were incurred the preceding year, the number of pupils that benefited, or the work contemplated for next year. There is a difference

of \$50,000,000 between the mayor's guess and the comptroller's guess as to the city's borrowing power not yet used. Department heads ask for 25 per cent. to 100 per cent. more than they need, estimates for unpopular purposes are shrunk, water is put in the requests for purposes favored by the fiscal board, and then later in the year the surplus in popular is transferred to unpopular purposes without due knowledge or consideration. Although this happens year after year and although reports might be made to show the fact, fiscal authorities go on voting without knowledge as to what actually became of moneys voted last year. Supplementary appropriations, like transfers, do not enter into budget-making. Imaginative assistants guess what the departments need, the board of estimate and apportionment guesses what they can do without. Reports are published too late to be read, *sans* units of inquiry, *sans* subtraction, *sans* percentages or classification. No one learns anything from them. No one would pretend to base method or policy upon them."

A "Bureau of City Betterment" made an effort toward bringing practical statistical help to the operations of government by presenting to the board of estimate a classified statement of the work of the Department of Health, as a basis for a budget. The immediate result was an increase of \$100,000 for school inspection, a health budget showing work planned, with its funds segregated to insure the execution of the plan, and instructions by the board of estimate to all departments to submit budgets for 1908 in such shape as to show the work done in 1907 and the work contemplated for 1908.

In continuation of this story the *New York Times* for Oct. 3, 1907, states that "Mayor McClellan, Mr. Metz, and the other gentlemen who preside over the apportionment of the city budget were gratified by the exceptionally clear estimates of the future needs of the Board of Health furnished yesterday by Dr. Darlington. They were so described and so detailed that the board could consider them intelligently and the tax-payers would know what they were expending their money for. The credit for this striking achievement belongs not only to the head of the Health Board, but to the Conference Committee of Comptroller Metz's department and to the Bureau of Municipal Research, whose recommendations Dr. Darlington adopted."

The Bureau of Municipal Research above referred to is perhaps the most interesting and important recent realization of the application of statistics to life. This is an outgrowth of the "Bureau of City Betterment" of the Citizens' Union, but quite independent of any political organization for obvious reasons, to secure greater effectiveness. The work of such a bureau was already outlined in Dr. Allen's book before the bureau itself was established. As there outlined, it would deal with

such matters as the analysis of annual budgets, examination of departmental reports from the standpoint of the tax-payers' interest in the accomplishment of results, critical study of the finance department's attempts to give publicity, scientific study of the framework of the city government, as, for instance, in charter provisions, organization of departments and methods of control, minute analysis of facts regarding different departments, organization, expense, results obtained and methods of presenting results—education, health, parks, docks, board of aldermen, borough president, board of estimate, comptroller's office, mayor's office; examination of facts regarding the city debt and franchises; extent and cause of remediable conditions that indicate governmental responsibility for the physical deterioration of children, for pauperism, for crime, for preventable disease, etc.

It is perhaps a mark of the apostle that Dr. Allen seems to think not only that his statistical gospel is needed by every man, but that it is brand-new; that is, in conscious acceptance. And so he seemed to regard this bureau as a somewhat unique enterprise. He certainly says definitely (p. ix.) that "at present there is *no* mechanism for learning and publishing the facts of social life and public administration." He seems to have forgotten for the time being such institutions as the Federal Census, with its various detailed investigations; or the Boston Department of Statistics, founded to do a work similar to that of the New York Bureau or the National Municipal League, which has interested itself especially in municipal accounting and recommended a scheme which has been approved and utilized by the Federal Census Bureau and by upwards of eighty cities.

But it may perhaps be said that the New York Bureau is trying the experiment of statistical research as a direct aid to governmental efficiency on a larger scale and under more favorable circumstances than it has been tried before, and from it most valuable results are sure to be gained, in experience of limitations as well as in positive achievement. Indeed, if Dr. Allen will write us another book at the end of ten years, telling us fully and frankly the outcome of the various experiments of that bureau and the other enterprises undertaken along the lines indicated in the first book, we shall have a couple of volumes forming a noteworthy contribution to the literature of statistics.

Is it too early to forecast some of the results of that and similar experiences? In the first place, the present rage for putting every conceivable thing in the shape of "statistics" and beginning every enterprise of any sort whatever with a long and elaborate and costly research will probably have subsided. Just now much of what is produced as "statistics" appears a laborious attempt to prove, by figures, what was sufficiently well known before to any one with a fair amount of common

sense. Is there typhoid fever in Pittsburg? There is no need of elaborate statistical apparatus to point out the evil and the remedy. There is no occasion for showing in detail the cost to the community through the families afflicted,—their wages, rents, household budgets, ancestry, or what not. The evil is seen in ten minutes' scrutiny of the bare record of cases and deaths: the remedy is abundantly known to every physician and every intelligent layman. What is needed in such cases is not a Galileo, but a Peter the Hermit.

Great practical difficulties are certain to arise in the application of the statistical method, even where the great complication of affairs makes it necessary, to miscellaneous masses of concrete fact. Dr. Allen lays proper emphasis on the necessity of finding a countable unit, but he altogether too cheerfully assumes that for every intelligent question there can be found "a statistical answer" (p. 27-28). It would be difficult, we think, to find the unit for a large proportion of the questions Dr. Allen himself asks in the long lists shown in his book. And even the sample schedules given by him show more than one question to be answered by "bad" or "good," or some other term not verifiable by an objective, definite standard. The results of the physical examination of school children, for example, have already been made use of by agitators, on the basis of such ambiguous terms as "need" of medical or surgical attention, "bad" digestion, "mal"-nutrition.

Another practical difficulty will be in securing original records which will show the units desired. This is at the bottom of half the trouble about adequate statistics, that no daily record has been kept of things we want to know. And it is difficult, even where there is a desire to do this, to anticipate the questions likely to be asked. The point of emphasis of interest changes from period to period: the daily record may be changed to answer the questions asked at a given date only to find that within a year other questions are being asked and the old questions are no longer heard. As comparison gives nine-tenths of their value to statistics, it is often necessary to choose between an old, inadequate basis of classification, allowing of comparison, and a new system, adequate for the moment, without that base of comparison.

Another practical difficulty is in the expense and effort involved. It is all very well to say that \$500 is well spent in saving \$1,000, but in practical statistical work it often happens that a scheme of great theoretical value in throwing light and saving cost will itself involve so much greater cost as to be impossible.

Furthermore, it has to be again recalled that the statistical aid is, after all, purely mechanical. Its usefulness depends very largely upon the "goodness" Mr. Allen puts in the background and upon intelligence in interpretation that is not always available. Any one who has worked

in statistical enterprises can readily furnish examples of this. Indeed, Mr. Allen's simple illustration of the value of statistical method affords an equally vivid illustration of its defect. Efficiency does promote goodness just about as the time-clock and cash-register promote punctuality and honesty. Any one who has ever managed an office knows that the perfunctory punctuality and honesty inculcated by the above-named devices are a poor excuse for the real thing; that the inert employee will remain inert under these checks and safeguards, and the actively ill-disposed will find ways to "beat" the machine. Yet the machine is, after all, better than nothing.

Thus with statistics. In a certain city department a commissioner was desirous of making a better record than his predecessor. In the statistical report of the department the number of orders issued was made a leading feature—on its face, a reasonable enough unit. The commissioner in question, by giving instructions to prepare the orders differently, made three out of the same material which had formerly made one, and showed a tremendously increased volume of work. Another plan resorted to was to issue orders as a result of perfunctory and worthless inspections. This also increased the volume of work done, and in this case there was no means of testing the quality. In the former case there was a means, as another tabulation of orders, on the basis of separate items attended to, showed the fallacy. But nine people out of ten, reading the report, would have failed to note the discrepancy.

This attempt to seize quality in the quantitative net is always imperfect, even under the best of circumstances. In the department referred to, units of work are necessarily employed to keep the inspectors up to a standard. Here, again, it is possible for an inspector to make good his required points by not doing his work thoroughly. There is a perpetual dispute going on between those who think the number should be so low as to permit of thorough work and those who think the number of units is of the most importance. Of course, a tendency to slight in quality of work is detected sooner or later by supervisors sent over the ground to test this. And this is not to say that cash-register methods are not necessary, but that they are cumbersome and mechanical at the best.

There are also the hindrances that arise when one set of people is trying to throw light upon and get light from another set of people. Dr. Allen has well summarized the main reasons why the production of intelligence has not been undertaken by the governing officials of large enterprises, public and private: first, fact is subordinated to expediency; second, in public life officials have been chosen for service to party rather than for fitness, or perhaps good men have been placed in office to carry out a program that a knowledge of actual conditions would have shown in

advance to be impracticable; third, officers are changed too often to discover needs and devise remedies or to develop a continuous policy.

And, lastly, it will always be difficult to get the public to use even the clearest and most carefully prepared information. For obvious psychological reasons the question, "Has any money been stolen?" will always be more vitally interesting than "Are we getting our money's worth?" After all "goodness" and "badness"—the absolute—is what takes the public eye, not the how much or how many. Nevertheless, the statistical method is the necessary machinery of the future. Like that other method of dealing with matters in gross,—the factory system,—it will never supersede the method of dealing at first hand with the concrete things, and may often follow very clumsily after; but it is necessary to supply the clamoring need of the world, which can no longer be supplied by individual effort.

KATE HOLLADAY CLAGHORN.